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SUBJECT: UNESCO/International Oceanographic Commission
Meeting coordinates Indian Ocean tsunami warning system

Ref: STATE 33352

¶1. SUMMARY and Introduction:
The Intergovernmental Oceanographic Commission (IOC) convened The International Coordination Meeting for the development of a Tsunami Warning and Mitigation System for the Indian Ocean within a Global Framework, at UNESCO Headquarters in Paris, 3-8 March 2005. The meeting Its p reinforced the IOC's lead role in coordinating efforts to set up global and regional tsunami warning systems; (b) , a primary USG goal. (The USG supports expanding the Pacific Tsunami Warning network -- which exists under the auspices

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of the IOC -- to the Indian Ocean and other at risk areas, within the framework of the Global Earth Observation System of Systems (GEOSS)). The meeting also resulted in the agreeing to eestablishment of an International Coordination Group for the Tsunami Warning and Mitigation System for the Indian Ocean, whose terms of reference will be approved at the IOC's General Assembly in June; (c) , as well as in the setting up of a process and timeline to design a basin-wide Indian Ocean Tsunami Warning System (IOTWS).

¶2. The meeting concluded with a The U.S. played a key role in the meeting. Its policy statement, made by Head of Delegation and U.S. Representative to the IOC Executive Council, NOAA Assistant Administrator Dr. Richard Spinrad, was well received (full text at end of cable). U.S. technical agency experts (USGS, USAID, NOAA) made formal presentations, intervened on key points and participated actively in all working groups. The experience of the U.S.-hosted Pacific Tsunami Warning Center was highlighted three times and U.S. interventions helped to establish a short term process to complete the IOTWS design outline and work plans perhaps as soon as June.

cCommuniqu that underscored national responsibility for establishing and managing national warning systems, including the emphasized the critical role of education in for community preparedness, , and and the role of urged all countries to engage in capacity building and technology transfer in the Indian Ocean region to help build tsunami warning and mitigation systems. It was decided that the Indian Ocean Tsunami Warning System (IOTWS) would consist of a coordinated network of national systems; though several countries vied for serving as the regional coordinator, there was no consensus on the matter. The communiqu also recommended that all Member States "make every endeavor" to share seismic, sea-level and other data relevant to tsunamigenic events at or near real-time. Within the IOC,

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the US has consistently supported open and free exchange of data, including in the context of tsunami warning systems; this is likely to remain a contentious issue as the IOTWS moves forward. The Communiqu and all presentations are available at http://ioc.unesco.org/indotsunami.

¶3. IOC will sponsor a follow-up meeting in Mauritius, 14-16 April, with the aim to develop the draft design and work plan for presentation to the June IOC General Assembly. For additional information, contact Liz Tirpak (DOS/OES, tirpakej@state.gov, 202-647-0238) End Summary and Introduction. The Communiqu and all presentations are available at http://ioc.unesco.org/indotsunami.

MEETING OVERVIEW

¶4. The IOC hosted the International Coordination Meeting for the Development of a Tsunami Warning and Mitigation System for the Indian Ocean within a Global Framework, in light of the tragic loss of life and massive destruction caused by the Indian Ocean tsunami of 26 December 2004.

¶5. The U.S. policy statement, made by Head of Delegation and U.S. Representative to the IOC Executive Council, NOAA Assistant Administrator Dr. Richard Spinrad, was well received (full text at end of cable). U.S. technical agency experts (USGS, USAID, NOAA) made formal presentations, intervened on key points and participated actively in all working groups. The experience of the U.S.-hosted Pacific Tsunami Warning Center was acknowledged by several speakers.

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¶6. Many U.S. delegation goals were reinforced in the opening statement by UNESCO Director-General Koichiro Matsuura, made a strong opening statement that who emphasized IOC's role in in the governance structure to linking internationally- run detection/alert systems with nationally- run warning systems. He underscored that a tsunami warning system should be fully embedded in the

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global , operational ocean observing system (GOOS) that is regularly used for other hazards, such as storm surges and tropical cyclones. Following the February Global Earth Observation System of Systems (GEOSS) meeting and third Earth Observation Summit in Brussels, Mr. Matsuura noted that "synergies between existing and new systems will make possible a multi-hazard approach that should improve the cost-effectiveness and long-term sustainability of the overall system." Lastly, he drew substantially on the experience of the Pacific Tsunami Warning Center IOC in designing and operating a warning system TWS, providing for open, free and unrestricted exchange of data and information, and highlighting promoting the three components of a TWS: tsunami hazard assessment of tsunami hazards; detection/warning system; and adoption of preparedness measures.

¶7. Twenty IOC member states offered various levels of support for the creation of an Indian Ocean tsunami warning system. No nation rejected the idea, but no nation pledged support without conditions. (Note: Australia, India, Indonesia, and Thailand appear to have the most advanced planning with funding to back their plans. All three plans are based on the Pacific Ocean Tsunami Warning System (PTWS) of an integrated approach of hazard assessment, warning guidance, and preparedness, with India's plan being the most comprehensive. End Note.)

¶8. Data Exchange Issue - Several participants acknowledged that "immediate, free and open distribution of raw data from observing systems in real time" should serve as the founding principle for all regional and global tsunami warning systems, while India could offer only "international product sharing." Other participants suggested that the IOC Data Exchange Policy, adopted by the Assembly in 2003, should serve as the "guiding principle" for IOTWS. (Note: Though the U.S. endorsed the IOC Data Exchange Policy, the Policy refers only to oceanographic data, not to seismic or other types of data crucial to an effective tsunami warning system.) The Communiqu ultimately recommended that all Member States "make every endeavor" to share seismic, sea-level and other data relevant to tsunamigenic events at or near real-time.

¶9. The Pacific Tsunami Warning Center and the Japan Meteorological Agency agreed to provide interim tsunami alerts to the Indian Ocean region based on existing facilities until adequate warning capabilities are established within the region. Four nations in the region (Australia, India, Indonesia, and Thailand) confirmed their plans to establish systems and capacities to detect and measure tsunamigenic events and issue appropriate warnings to forecast their impacts. Until and unless a regional center is identified, the national centers agreed to supply product and services to other national centers in the region.

¶10. Discussions were organized by topic, addressed first in panel and later in three separate working groups. The three main topics were technical aspects, organizational aspects, awareness and preparedness.

Technical Aspects

DATA EXCHANGE
Data exchange policy and practice was a recurrent theme in throughout the meeting. Several participants (name the countries?) acknowledged that "immediate, free and open distribution of raw data from observing systems in real time" is a founding principle for all regional and global tsunami warning systems, while others suggested that the IOC

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Data Exchange Policy, adopted by the Assembly in 2003, should serve as the "guiding principles" for IOTWS. Though

the U.S. endorsed the IOC Data Exchange Policy, it refers only to oceanographic data, not to seismic or other types of data crucial to an effective tsunami warning system. The Communiqu ultimately recommended that all Member States "make every endeavor" to share seismic, sea-level and other data relevant to tsunamigenic events at or near real-time.

BEYOND THE INDIAN OCEAN

The final session on "The Indian Ocean System within a Global Framework" provoked substantial debate as to how other region's tsunami warning systems (e.g., Mediterranean and Northeast Atlantic, Caribbean and Central West Atlantic, and Southwest Pacific) would be reflected in the Communiqu. India and other IO members provided text that limited examples to areas adjacent to the Indian Ocean, such as South-East Asia and the South China Sea.

Responding to prior U.S. correspondence, The IOC Executive Secretary Dr. Patricio Bernal outlined his interest in

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discussing potential FY 05 financial support via extra-budgetary U.S. contributions for...(letter to be available tomorrow).

OTHER SPECIAL TOPICS?

?

- roles of India, Japan, other key delegations
- anything on donor concerns
- During the meeting, the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) announced: ......
- ????

¶11. The panel on the technical aspects of tsunami warning systems (TWS) was chaired by the representative from Indonesia who presented some graphical material on the effects of the recent tsunami and the need for improvement of monitoring and warning technologies in the Indian Ocean. The panel was made up of scientific and technical presentations by experts from the Russian Federation and Japan. The Russian expert presented statistics on tsunami occurrence and likelihoods of tsunami generation and their severity from earthquakes of various magnitudes. The Japanese experts covered the current technologies used in Japan to detect tsunami and issues warnings, with particular emphasis on the challenges of warnings of local tsunamis compared to those caused by distant earthquakes. Presentations also reviewed the factors controlling tsunami height and on-shore run-up. The Chair of the IGC/ITSU gave the most scientifically controversial presentation by describing "emerging technologies" for tsunami detection and warning, including perturbation measurement from the ionosphere, infrasound measurements, satellite-based ocean height measuring systems, and on-shore radar.

¶12. Dr. Neville Smith (Australia) chaired the technical aspects a working group, which was tasked to identify and recommend: (1) the technological basis for a tsunami warning system (measurements and telecommunications, analysis, processing and hazard/risk assessment); (2) design elements of an IOTWS, (3) the strategy for building an IOTWS, and (4) new technologies and research and development needed. The resulting report consists of provided both general and specific a series of bulleted points recommendations that will be considered in for the preparation of the design plan :

a necessary condition for the success of any design for an IOTWS is the free and immediate flow of raw observational data, in real time over robust communication links, to all national and regional participants in the system is a necessary component for TWS.

common approaches to data processing, hazard and risk modeling, and warning dissemination and message format are essential.

coastal bathymetry, sea floor configuration, topography and land mapping are essential and must be carried out and be made available in high resolution format for all at-risk national coastal regions.

utilization of new technologies should be explored.

the requirements for use of space technology for tsunami applications must be defined.

network must enable the all data, as well as the results of the real-time analysis, need to be made available to all analysis/warning centers in real time for the rapid rapid verification of tsunami waves from sea-level and ocean-bottom sensors.

geostationary communication satellites operating in the Indian Ocean region and the use of Global Telecommunication System (GTS) of WMO, which is currently operational used for the Pacific Tsunami Warning System (PTWS) for collection of sea-level observations and distribution of bulletins and warnings, should be upgraded within 6 months and fully operational to address needs of the Indian Ocean region in

the interim and longer-term be explored.
broadband is needed for real-time distribution of seismic data.
telecommunication systems that meet these requirements should be identified and utilized.
risk management framework should be employed and complemented by robust models and scenarios of historical and potential tsunami events that can be used in the formation and dissemination of warnings.
for both seismic and sea level networks - upgrades must must
be identified and prioritized.
establishment of deep ocean buoys useful for tsunami monitoring is needed.
cable-based systems should also be assessed as these instruments are important for slumping events and other events that are not seen in seismic measurements.
network planning should start with identifying and mapping the tsunami prone areas. This should be based upon a historical study of earthquake and tsunami occurrences.
robustness and durability of the instruments and the system as a whole to the impacts of the earthquakes needs to be considered
emerging technologies should be considered in the overall strategy, to ensure the evolution of the system relative to best practice.

¶12. In addition, further rationalization of the technical aspects is required because, particularly in During the instrumentation and communication discussions, vocal participants with narrow interests often held the floor and carried their positions forward. Nevertheless, there was
was
the recognition that many of the pieces for the ITOTWS are in place or in progress; the challenge rests in putting the pieces together in a structure that has the needed telecommunication, data processing, and warning dissemination capacities.

¶13. The seismic network was reviewed and strengths and weaknesses were identified.
For both seismic and sea level networks, upgrades must be identified and prioritized, and data must be made available in real-time to centers designated for processing and analysis via satellites that are immediately retransmitted over the WMO Global Telecommunication System to appropriate warning centers. A need for the establishment of deep ocean buoys useful for tsunami monitoring and warning was also identified, and cable-based systems should also be assessed as these instruments are important for slumping events and other events that are not seen in seismic measurements.

The general strategy of the IOTWS was defined to include: immediate, free and open distribution of raw data from the observing systems in real-time must be acknowledged as a founding principle for all regional and global tsunami warning systems. , since Without suchwithout, both the timeliness and effectiveness of the system may be severely compromised and the risk may be greater than would otherwise be the case. Any network planning should start with identifying and mapping the tsunami prone areas. This should be based upon a historical study of earthquake and tsunami occurrences. It was noted that Mmany of the

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standards that underlie the systems for open data collection and exchange can be adopted (or adapted) from already established international systems. A sustained and reliable Indian Ocean measurement network will require responsible national and international actions and cooperation, including sustained investment, national and commitments, and international cooperation. There is need to develop the networks within a consistent integrated framework for systems of systems.

¶14. In terms of the technological implementation, it was agreed that the tsunami warning system as a whole should build on and be a part of a multi-purpose system, since . The the sustainability of the observing system including cost effectiveness and efficiency are also enhanced with such an approach. National and international agencies need to invest in a coordinated centralization approach to build an integrated tool for earthquake and tsunami surveillance and scientific research. The robustness and durability of the instruments and the system as a whole to the impacts of the earthquakes needs to be considered.

¶15. As the tsunami early warning system will be based upon various data sourcesacquisition and dissemination platforms, in-situ ocean and land stations, and networks, it is it was emphasised that the

network of stations for tsunami early warning should be constantly monitored to guarantee its reliability and effectiveness.
data must be quality controlled, and archived for post-event assessment and research.

observation systems should be qualified and certified.
warning criteria and standards need to be established drawing from recognizing the PTWC protocols (4: advisory, watch, warning...). .
The legal responsibility for issuing warnings (that may lead to evacuation) are assumed by national centers (unless other arrangements are agreed upon by countries).
The group also briefly considered the requirement for information and technology transfer, from those nations with capability (including from beyond the region) to Indian Ocean nations desiring enhanced technical capabilities.

emerging technologies should be considered in the overall strategy, to ensure the evolution of the system relative to best practice.

Organizational Aspects

¶16.
The Session on The panel on "Organizational and Practical al
Arrangements for a Regional Tsunami Warning and Mitigation System" featured presentations by the national programs of Chile and Japan. Dr. Charles McCreery, Director Pacific Tsunami Warning Center, and Dr. Laura Kong, Director,

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International Tsunami Information Center (ITIC) presented regional dimensions.

¶17. It was noted that Nnational centers are responsible for interpreting warning guidance from regional center(s), issuing local warnings, and issuing alerts for local events, while regional centers provide efficiency of operations, access to a larger suite of observations, and sharing of services. Regional centers also provide serve as a focal point for mitigation activities, communications between stakeholders, products (e.g., tsunami travel and height maps), se services (e.g., testing of communications systems, expertise exchange, quality control), and can provide backup functions for national centers. Long-term sustainability - rRegional commitment and support and support from , national support, and international support levels can - guarantee long-term sustainability of regional centersis a prerequisite for a regional center.

¶18. Dr. Laura Kong, provided an overview of the ITIC's role and capabilities. The ITIC described how the ITIC monitors the international tsunami warning system for the Pacific to improve operations,; assists member states with technology transfer,; and provides technical assistance and training to improve national and community-level preparedness. Dr. Kong also noted the importance of hazard reduction strategies, including preparation of inundation maps, evacuation maps, simulations and drills, to facilitate an effective response to tsunami warning. ITIC has developed a substantial amount of training programs and outreach materials that it uses in its training programs to were offered to help prepare both national emergency management agencies and local communities to respond appropriately to tsunami warnings.

¶19.
Twenty IOC member states offered various levels of support for the creation of an Indian Ocean tsunami warning system. No nation rejected the idea, but no nation pledged support without conditions. India, Indonesia, and Thailand appear to have the most advanced planning with funding to back their plans. All three plans are based on the Pacific Ocean tsunami warning system of an integrated approach of hazard

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assessment, warning guidance, and preparedness with India's plan being the most comprehensive. Calls for unrestricted data sharing were voiced by several nations while the plans presented by India offer international product sharing. Ten organizations made presentations on their capabilities to help implement an IO tsunami warning system. The most promising presentations to make a functional tsunami warning system were by WMO, IRIS, GLOSS, and GEOSS. If IOC can work effectively with these organizations the probability of success is high.

Conclusions of Working Group 2the working group on the organizational aspects of an IOTWS are were captured reflected in the CCommuniqu.

The Pacific Tsunami Warning Center and the Japan Meteorological Agency have agreed to provide interim tsunami alerts to the region based on existing facilities until adequate warning capabilities are established within the region. Four nations in the region (Australia, India, Indonesia, and Thailand) have plans to establish systems and capacities to detect and measure tsunamigenic events and issue appropriate warnings to forecast their impacts. The

products and services of these centers will be made available to other national centers in the region. Guidelines addressing the responsibilities of national centers were developed. In conjunction with the designation of a national contact point is the necessity for each country to develop a response plan to warnings.

AWARENESS AND PREPAREDNESS

¶20. Session 5 The panel addressed on Ttsunami aAwareness and pPreparedness includrevieweding national preparedness pPlans (New Zealand and Indonesia), community-based early warning systems (ISDR, Red Cross), awareness building and public information (Asian Disaster Reduction Centre), and institutional capacities for moving forward (UNDP).

¶21. A The corresponding third working group chaired by _____considered: reviewed (1) risk and vulnerability assessment; (2) public awareness and education; and (3) preparedness and emergency response.
To address risk reduction, the the WG 3 group called for preparation of hazard risk, inundation and evacuation maps that identify escape routes, safe areas and shelters. The group acknowledged Oother methods of reducing risks - beyond the scope of ITSU - includinge land-use planning, structural interventions (building codes, coastal structures, elevated shelters), and non-structural interventions (protection, rehabilitation, and conservation of coastal ecosystems, including mangroves and coral reefs that help buffer coastal communities).

¶22. Working Group Three highlighted the importance of aAwareness, education, and public outreach as were noted as essential ingredients in tsunami early warning systems, using recognizing that innovation and local knowledge to can be used to build a culture of safety. The group also called for special attention to building national and local preparedness and emergency response capacities, with clear and careful delineation of functions and responsibilities.

A session on the Technical Aspects of TWS was chaired by the representative from Indonesia who presented some graphical material on the effects of the recent tsunami and the need for improvement of monitoring and warning technologies in the Indian Ocean. The body of the session was made up of scientific and technical presentations by experts from the Russian Federation and Japan. The Russian expert presented statistics on tsunami occurrence and likehoods of tsunami generation and their severity from earthquakes of various magnitudes. The Japanese experts covered the current technologies used in Japan to detect tsunami and issues warnings, with particular emphasis on the challenges of warnings of local tsunamis compared to those caused by distant earthquakes. Their presentations also covered the factors controlling tsunami height and on-shore run-up. The Chair of the IGC/ITSU gave the most scientifically controversial presentation, whichdescribed various "emerging technologies" that might be applied to tsunami detection and warning; measuring perturbations in the ionosphere, the use of infrasound measurements, the use of satellite-based ocean height measuring systems, and the use of on-shore radar in tsunami warning systems.

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BEYOND THE INDIAN OCEAN

¶23. The final session on "The Indian Ocean System within a Global Framework" provoked substantial debate as to how other region's tsunami warning systems (e.g., Mediterranean and Northeast Atlantic, Caribbean and Central West Atlantic, and Southwest Pacific) would be reflected in the Communiqu. India and other IO members provided text that limited examples to areas adjacent to the Indian Ocean, such as South-East Asia and the South China Sea.

Participating Organizations
--- SESSION 4

¶24. Several organizations were invited to make announcements during the proceedings::

Asian Disaster Preparedness Center (ADCP) - Described experience in regional disaster projects and described a regional TWS that includes earthquake and tsunami monitoring.

Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) - Offered to share data archival technology

Global Earth Observational System of Systems (GEOSS) - Guy Duchossois described program and presented Tsunami Communiqu.

GLOSS (IOC global sea level program) - Described d current contribution in IO and recommended expansion of real time reporting stations.

International Maritime Organization (IMO) - Described how warnings might be disseminated via ships.

Incorporated Research Institutions for Seismology - David Simpson described the standardized, real-time global seismic network, how it detected the Dec 26 earthquake, and how it could contribute to a global TWS.

International Telecommunications Union (ITU) - Described their role in communications for all aspects of TWS.

UN/ESCAP- - Described capabilities as they relate to a regional of global TWS.

WMO - Described operational role in world weather forecasting and recommended that the TWS use their Global Telecommunications Networks to deliver tsunami warning information to ION nations.

OLIVER

IOC - Organized meeting and is committed to lead the development of IO and global TWS.